



**SECTION 735**

**CULVERT PIPE LINER**

**735.1 Description.** This work shall consist of providing and installing pipe liner in existing culvert pipes.

**735.2 Material.** All material shall be in accordance with Division 1000, Material Details, and specifically as follows:

Item	Section
Pipe Liner	1046
Grout	1066

**735.2.1** The joints shall be soil-tight with no gaskets required.

**735.2.2** Approval for interlocking methods may be obtained by submitting the proposed system to Construction and Materials.

**735.3 Construction Requirements.** Before any pipe liner construction is started, the culvert to be lined shall be thoroughly cleaned of all sediment and debris. Existing culvert ends that are damaged or impede installation shall be straightened or removed at the engineer's direction at the contractor's expense. The dimensions of the pipe liner shall meet the following requirements:

Culvert Pipe Liner Dimensions			
Existing Pipe Size (ID) in.	Liner Clearance <sup>a</sup>		ID
	Minimum in.	Maximum in.	Minimum in.
12	0.5	2	9
15	0.5	3	11
18	0.5	3	13
21	0.5	3	15
24	0.5	4	17
27	1	4	20
30	1	4	22
33	1	4	24
36	1	4	26
42	1	6	30
46	2	6	33
48	2	6	35
54	2	8	39
60	2	9	43
72	2	10	52

<sup>a</sup>Clearance shall be the difference between the inside diameter (ID) of the existing pipe and the outside diameter (OD) of the pipe liner.

**735.3.1** The pipe liner shall be joined into a continuous length by an approved interlocking method. Each joint shall be checked for soil-tightness before each section of pipe liner is inserted.

**735.3.2** The insertion may be made by pushing or pulling the assembled pipe liner from either end of the culvert. The insertion operation shall not cause the joints to separate. A temporary nose cone or plug may be necessary to guide the pipe liner past minor obstructions. The handling of pipe liner shall be in a manner such that the pipe liner is not damaged. Pipe liner with deep scratches or gouges shall be removed and replaced at the contractor's expense.

**735.3.3** After the pipe liner has been completely inserted, inspected in place by the engineer, and cooled to the temperature of the existing culvert, the liner shall be cut off as directed by the engineer and grouted in place.

**735.3.3.1** Expansive grout shall contain only enough water to make the grout stiff, but workable. The grout shall extend into the annular space between the existing culvert and pipe liner for a minimum distance of 6 inches from the face of the pipe to a flexible grout stop comprised of flexible foamed polyethylene, pavement joint backer rod or other material approved by the engineer. Care shall be taken such that the grouting pressure does not exceed the external hydrostatic collapse resistance of the liner.

**735.3.3.2** Drainage of the annular space between the culvert and pipe liner shall be provided by drilling a circumferential line of weep holes in the lower half of the pipe liner approximately 2 inches from the downstream grout stop. The weep holes shall be no less than 3/8 inch or more than 1/2 inch in diameter and shall be spaced circumferentially at 3-inch centers starting at the invert and extending upward to the spring line of the pipe liner.

**735.3.4** The pipe liner shall be anchored to the existing culvert by either using a minimum of two 1/2-inch diameter bolts with washers or other methods approved by the engineer. The pipe liner shall be centered in the existing pipe by either anchor bolts installed at the upstream end, spaced equal distance, above the spring line or other methods approved by the engineer.

**735.4 Method Of Measurement.** Final measurement will not be made except for authorized changes during construction or where appreciable errors are found in the contract quantity. Where required, measurement of pipe liner, complete in place, will be made to the nearest foot along the geometrical center of the pipe liner. The revision or correction will be computed and added to or deducted from the contract quantity. This item shall include all material, labor, equipment and excavation necessary to complete the described work.

**735.5 Basis Of Payment.** The accepted quantities for the pipe liner, complete in place, will be paid for at the contract unit price for each of the pay items included in the contract.